

**TD62301P, TD62301F, TD62302P, TD62302F**

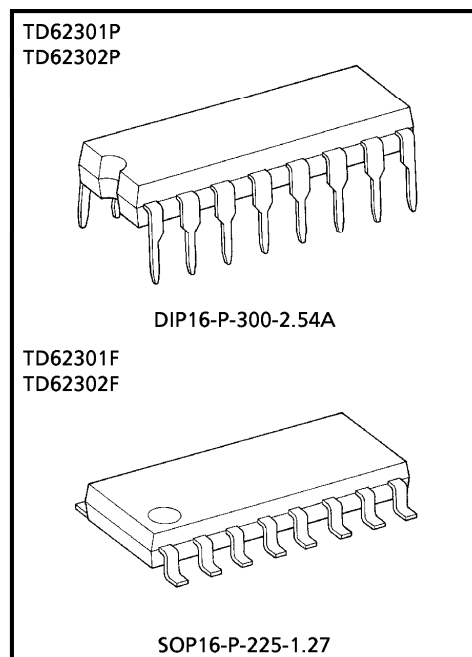
**7CH LOW SATURATION SINK DRIVER**

The TD62301P/F and TD62302P/F are comprised of seven NPN low saturation drivers.

All units feature integral clamp diodes for switching inductive loads. Applications include relay, hammer, lamp and LED drive in low voltage system.

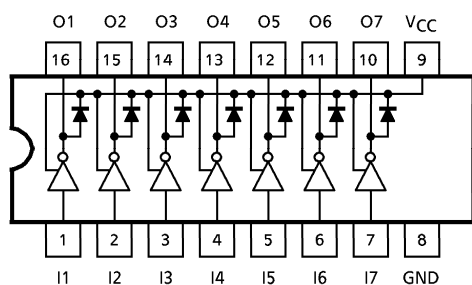
**FEATURES**

- Low saturation output  $V_{CE(sat)} = 0.7V$  (Max.)
- Output rating (single output) 15V (Min.) / 200mA (Max.)
- High DC transfer ratio 1000 (Min.)
- Output clamp diodes
- Input register : TD62301P/F  $R_1 = 2k\Omega$ ,  $R_2 = 20k\Omega$   
: TD62302P/F  $R_1 = 8.4k\Omega$ ,  $R_2 = 15k\Omega$
- Inputs compatible with TTL and 3~6V CMOS
- Package type-P : DIP-16 pin
- Package type-F : SOP-16 pin

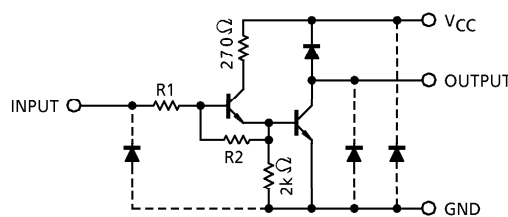


Weight  
 DIP16-P-300-2.54A : 1.11g (Typ.)  
 SOP16-P-225-1.27 : 0.16g (Typ.)

**PIN CONNECTION (TOP VIEW)**



**SCHEMATICS (EACH DRIVER)**



TD62301P :  $R_1 = 2k\Omega$ ,  $R_2 = 20k\Omega$   
 TD62302P :  $R_1 = 8.4k\Omega$ ,  $R_2 = 15k\Omega$

(Note) The input and output parasitic diodes cannot be used as clamp diodes.

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**MAXIMUM RATINGS (Ta = 25°C)**

| CHARACTERISTIC              | SYMBOL                | RATING                      | UNIT    |
|-----------------------------|-----------------------|-----------------------------|---------|
| Supply Voltage              | V <sub>CC</sub>       | - 0.5 ~ 15                  | V       |
| Output Sustaining Voltage   | V <sub>CE (SUS)</sub> | - 0.5~V <sub>CC</sub> + 0.5 | V       |
| Output Current              | I <sub>OUT</sub>      | 200                         | mA / ch |
| Input Voltage               | V <sub>IN</sub>       | - 0.5~15                    | V       |
| Input Current               | I <sub>IN</sub>       | 15                          | mA      |
| Clamp Diode Reverse Voltage | V <sub>R</sub>        | 15                          | V       |
| Clamp Diode Forward Current | I <sub>F</sub>        | 200                         | mA      |
| Power Dissipation           | P                     | 1.0                         | W       |
|                             | F                     | 0.625 (Note)                |         |
| Operating Temperature       | P                     | - 30~75                     | °C      |
|                             | F                     | - 40~85                     |         |
| Storage Temperature         | T <sub>stg</sub>      | - 55~150                    | °C      |

(Note) On Glass Epoxy PCB (30×30×1.6mm Cu 50%)

**RECOMMENDED OPERATING CONDITIONS (Ta = - 40 ~ 85°C and Ta = - 30 ~ 75°C for Type-P)**

| CHARACTERISTIC              | SYMBOL           | CONDITION                                      | MIN. | TYP. | MAX.            | UNIT |
|-----------------------------|------------------|--|------|------|-----------------|------|
| Supply Voltage              | V <sub>CC</sub>  |  | 3    | —    | 6               | V    |
| Output Current              | I <sub>OUT</sub> | DC 1 Circuit                                   | 0    | —    | 180             | mA   |
|                             |                  | T <sub>pw</sub> = 25ms, Duty = 50%, 4 Circuits | 0    | —    | 150             |      |
| Input Voltage               | V <sub>IN</sub>  |  | —    | —    | V <sub>CC</sub> | V    |
| Clamp Diode Reverse Voltage | V <sub>R</sub>   |  | —    | —    | V <sub>CC</sub> | V    |
| Clamp Diode Forward Current | I <sub>F</sub>   |  | —    | —    | 180             | mA   |
| Power Dissipation           | P                |  | —    | —    | 0.44            | W    |
|                             | F                | (Note)   | —    | —    | 0.325           |      |

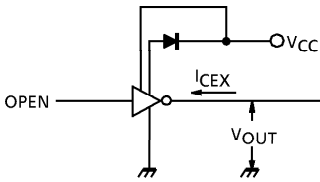
(Note) On Glass Epoxy PCB (30×30×1.6mm Cu 50%)

**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

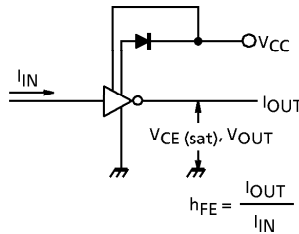
| CHARACTERISTIC              |           | SYMBOL                | TEST CIR-CUIT | TEST CONDITION  | MIN. | TYP. | MAX. | UNIT      |
|-----------------------------|-----------|-----------------------|---------------|---|------|------|------|-----------|
| Output Leakage Current      |           | I <sub>CEX</sub>      | 1             | V <sub>CC</sub> = 6V, V <sub>OUT</sub> = 6V<br>Ta = 50°C                  | —    | —    | 7    | μA        |
|                             |           |                       |               | V <sub>CC</sub> = 6V, V <sub>OUT</sub> = 6V<br>Ta = 25°C                  | —    | —    | 1    |           |
| Output Saturation Voltage   |           | V <sub>CE (sat)</sub> | 2             | V <sub>CC</sub> = 5V, I <sub>IN</sub> = 0.14mA<br>I <sub>OUT</sub> = 70mA | —    | —    | 0.5  | V         |
|                             |           |                       |               | V <sub>CC</sub> = 5V, I <sub>IN</sub> = 0.3mA<br>I <sub>OUT</sub> = 150mA | —    | —    | 0.7  |           |
| DC Current Transfer Ratio   |           | h <sub>FE</sub>       | 2             | V <sub>CC</sub> = 5V, V <sub>OUT</sub> = 2V<br>I <sub>OUT</sub> = 120mA   | 1000 | 2000 | —    |           |
| Input Current               | Output On | TD62301P/F            | 3             | V <sub>CC</sub> = 5V, V <sub>IN</sub> = 2.4V<br>I <sub>OUT</sub> = 120mA  | —    | —    | 0.60 | mA        |
|                             |           | TD62302P/F            |               |   | —    | —    | 0.14 |           |
| Input Voltage               | Output On | TD62301P/F            | 4             | V <sub>CC</sub> = 5V, I <sub>IN</sub> = 0.2mA<br>I <sub>OUT</sub> = 120mA | —    | —    | 2.3  | V         |
|                             |           | TD62302P/F            |               |   | —    | —    | 4.0  |           |
| Clamp Diode Forward Voltage |           | V <sub>F</sub>        | 5             | I <sub>F</sub> = 120mA  | —    | —    | 2.0  | V         |
| Supply Current              |           | I <sub>CC</sub>       | 6             | I <sub>F</sub> = 120mA  | —    | 15   | 22   | mA / Gate |
| Input Capacitance           |           | C <sub>IN</sub>       | —             | V <sub>IN</sub> = 0, f = 1MHz   | —    | 15   | —    | pF        |
| Turn-On Delay               |           | t <sub>ON</sub>       | 7             | V <sub>CC</sub> = 6V, R <sub>L</sub> = 33Ω<br>C <sub>L</sub> = 15pF       | —    | 0.1  | —    | μs        |
| Turn-Off Delay              |           | t <sub>OFF</sub>      |               |   | —    | 0.2  | —    | μs        |

**TEST CIRCUIT**

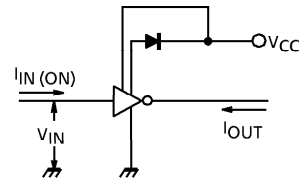
1.  $I_{CEX}$



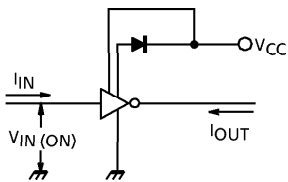
2.  $h_{FE}$ ,  $V_{CE(sat)}$



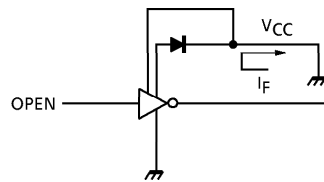
3.  $I_{IN(ON)}$



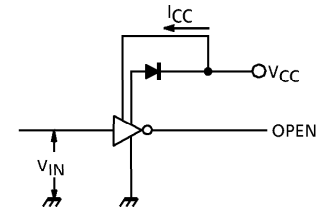
4.  $V_{IN(ON)}$



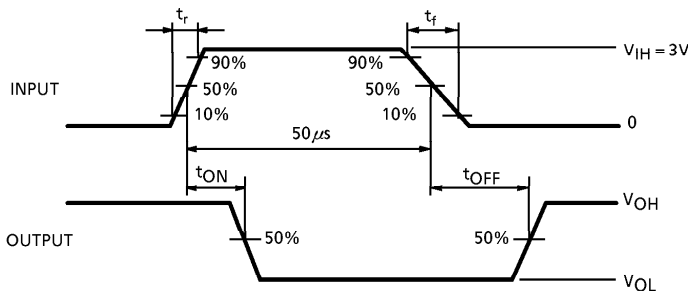
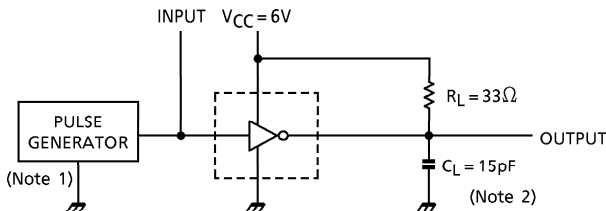
5.  $V_F$



6.  $I_{CC}$



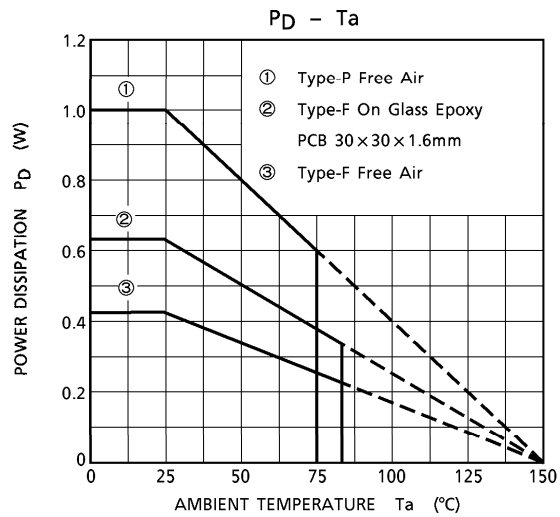
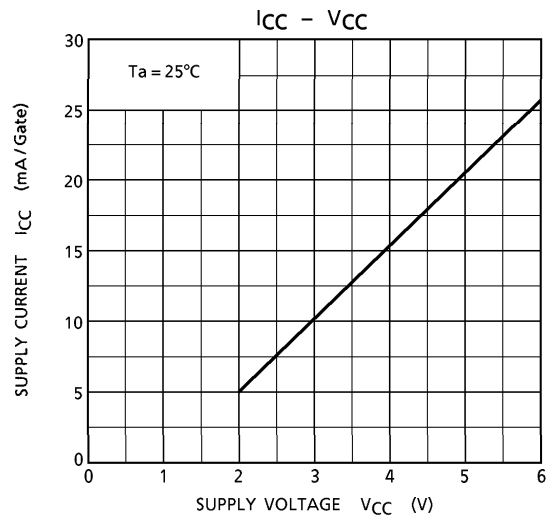
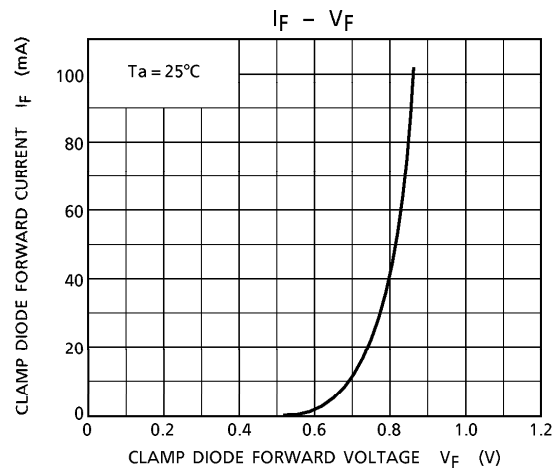
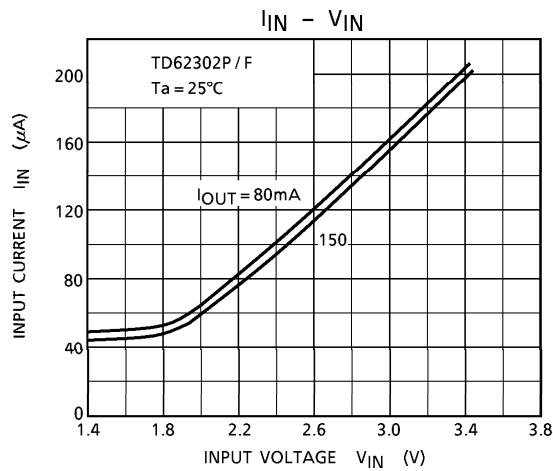
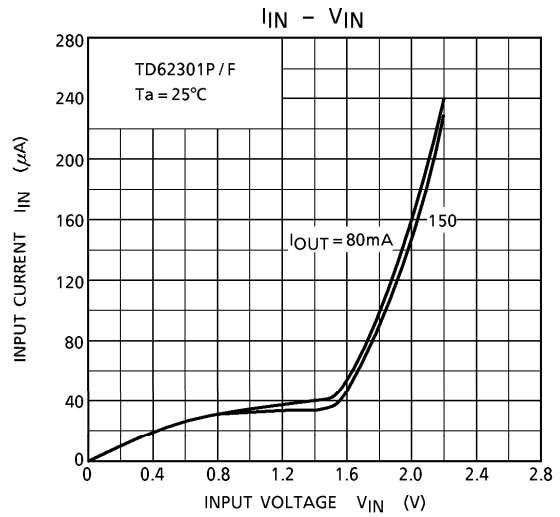
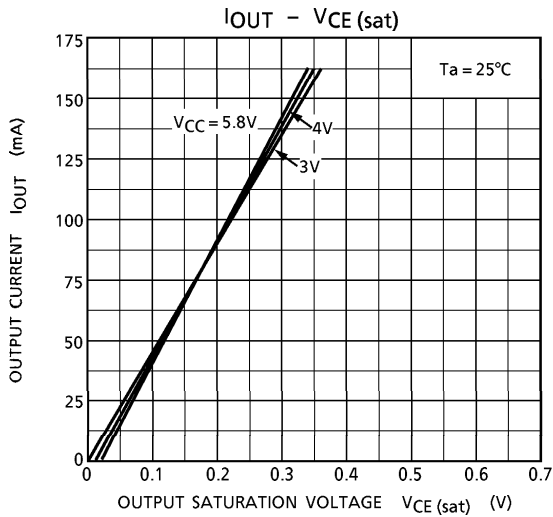
7.  $t_{ON}$ ,  $t_{OFF}$



(Note 1) Pulse Width  $50\mu s$   
 Duty Cycle 10%  
 Output Impedance  $50\Omega$   
 $t_r \leq 5ns$ ,  $t_f \leq 10ns$   
 (Note 2)  $C_L$  includes probe and jig capacitance.

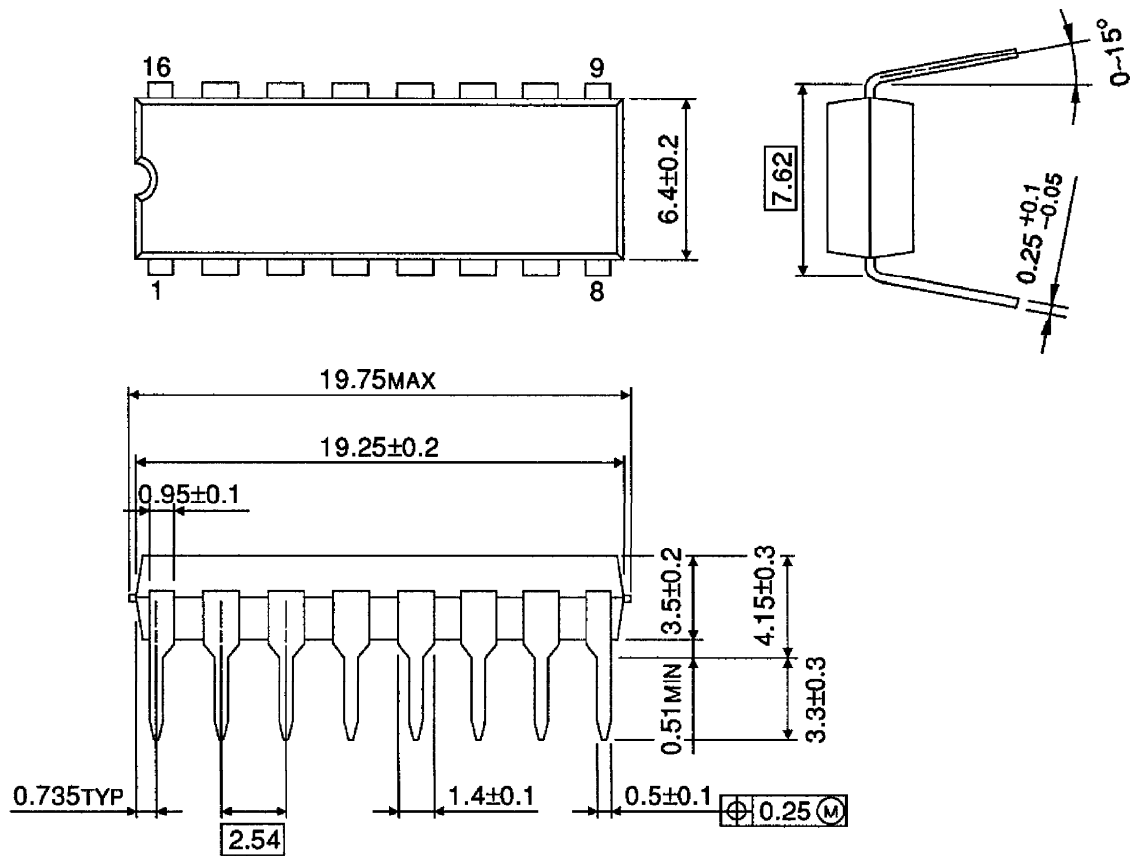
**PRECAUTIONS for USING**

Utmost care is necessary in the design of the output line,  $V_{CC}$  and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.



**OUTLINE DRAWING**  
DIP16-P-300-2.54A

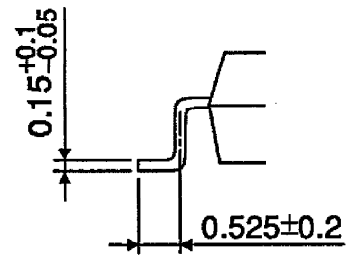
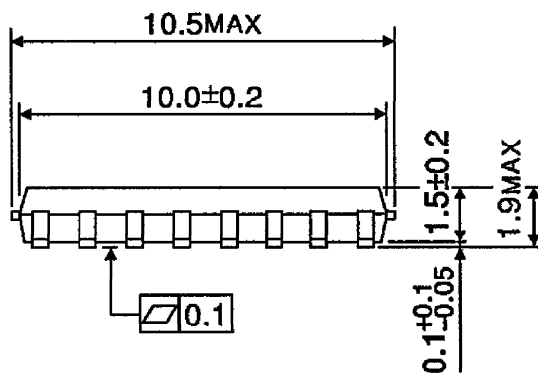
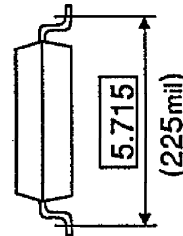
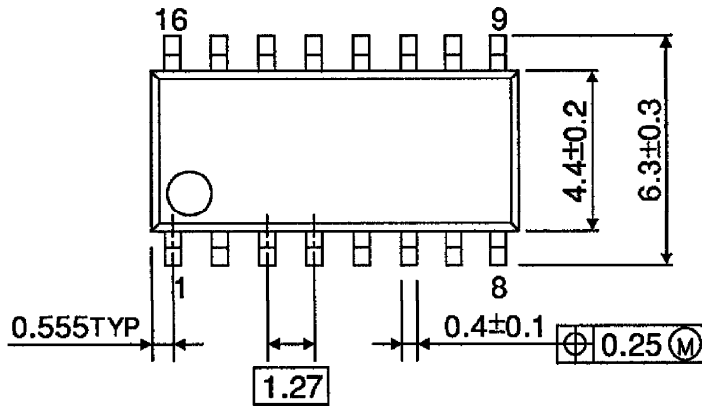
Unit : mm



Weight : 1.11g (Typ.)

**OUTLINE DRAWING**  
SOP16-P-225-1.27

Unit : mm



Weight : 0.16g (Typ.)